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Part 1

RENEWABLE ENERGY AND ENERGY EFFICIENCY TECHNOLOGY COMPETITIVENESS ACT OF 1989

OCTOBER 25, 1989.—Ordered to be printed

Mr. ROE, from the Committee on Science, Space, and Technology, submitted the following

REPORT

[To accompany H.R. 1216, which on March 1, 1989 was referred jointly to the Committees on Science, Space, and Technology and Energy and Commerce]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 1216) to authorize appropriations to the Department of Energy for the renewable energy, energy efficiency research and development programs for fiscal year 1991–fiscal year 1993 and for the SP–100 Program for fiscal year 1990 and fiscal year 1991, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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The amendment is as follows:

Strike all after the enacting clause and insert in lieu thereof the following:

That this Act may be referred to as the "Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989".

39-006

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SEC. 2. PURPOSE.

It is the purpose of this Act to direct the Secretary of Energy, acting in accordance with authority contained in the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901-5920) and other law applicable to the Secretary, to pursue an aggressive national program of research, development, and demonstration of renewable energy and energy efficiency technologies in order to ensure a stable and secure future energy supply by—

(1) directing the Secretary to undertake initiatives to improve the ability of the private sector to commercialize in the near term renewable energy and energy efficiency technologies; and

(2) fostering collaborative research and development efforts involving the private sector through government support of a program of joint research and development venture projects.

SEC. 3. DEFINITIONS.

As used in this Act—

(1) the term "joint research and development venture" means a joint research and development venture under the National Cooperative Research Act of 1984 (15 U.S.C. 4301 et seq.);

(2) the term "non-Federal person" means an entity located in the United States, the controlling interest (as defined by the Secretary) of which is held by citizens of the United States, which agrees to manufacture or reproduce substantially within the United States for commercial sale any invention that may result from an agreement under this Act;

(3) the term "Secretary" means the Secretary of Energy; and

(4) the term "United States" means the several States, the District of Columbia, the Commonwealth of Puerto Rico, the United States Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any other Commonwealth, territory, or possession of the United States.

SEC. 4. NATIONAL GOALS AND MULTI-YEAR FUNDING FOR FEDERAL WIND, PHOTOVOLTAICS, AND SOLAR THERMAL PROGRAMS.

(a) NATIONAL GOALS.—The following are declared to be the national goals for the wind, photovoltaics, and solar thermal energy programs being carried out by the Secretary:

(1) WIND.—(A) In general, the goals for the Wind Energy Research Program include improving design methodologies and developing more reliable and efficient wind turbines to increase the cost competitiveness of wind energy. Research efforts shall emphasize—

(i) activities that address near-term technical problems and assist private sector exploitation of market opportunities of the wind energy industry;

(ii) developing technologies such as advanced airfoils and variable speed generators to increase wind turbine output and reduce maintenance costs by decreasing structural stress and fatigue;

(iii) increasing the basic knowledge of aerodynamics, structural dynamics, fatigue, and electrical systems interactions as applied to wind energy technology; and

(iv) improving the compatibility ~~of electricity~~ produced from wind farms with conventional utility needs.

(B) Specific goals for the Wind Energy Research Program shall be to—

(i) reduce average wind energy costs to 3 to 5 cents per kilowatt hour by 1995;

(ii) reduce capital costs of new wind energy systems to $500 to $750 per kilowatt of installed capacity by 1995;

(iii) reduce operation and maintenance costs for wind energy systems to less than one cent per kilowatt hour by 1995; and

(iv) increase capacity factors for new wind energy systems to 25 to 35 percent by 1995.

(2) PHOTOVOLTAICS.—(A) In general, the goals of the Photovoltaic Energy Systems Program shall include improving the reliability and conversion efficiencies of and lowering the costs of photovoltaic conversion. Research efforts shall emphasize advancements in the performance, stability, and durability of photovoltaic materials.

(B) Specific goals of the Photovoltaic Energy Systems Program shall be to—

(i) improve operational reliability of photovoltaic modules to 30 years by 1995;

(ii) increase photovoltaic conversion efficiencies by 20 percent by 1995;

(iii) decrease new photovoltaic module direct manufacturing costs to $800 per kilowatt by 1995; and

(iv) increase cost efficiency of photovoltaic power production to 10 cents per kilowatt hour.

(3) SOLAR THERMAL.—(A) In general, the goal of the Solar Thermal Energy Systems Program shall be to advance research and development to a point where solar thermal technology is cost-competitive with conventional energy sources, and to promote the integration of this technology into the production of industrial process heat and the conventional utility network. Research and development shall emphasize development of a thermal storage technology to provide capacity for shifting power to periods of demand when full insulation is not available; improvement in receivers, energy conversion devices, and innovative concentrators using stretch membranes, lenses, and other materials; and exploration of advanced manufacturing techniques.

(B) Specific goals of the Solar Thermal Energy Systems Program shall be to—

(i) reduce solar thermal costs for industrial process heat to $9.00 per million Btu; and

(ii) reduce average solar thermal costs for electricity to 4 to 5 cents per kilowatt hour.

(4) OTHER TECHNOLOGIES.—The Secretary shall submit to the Congress, as part of the first report submitted under section 10, recommendations for specific cost goals and other pertinent goals for 1995 for Department of Energy research, development, and demonstration programs in Biofuels Energy Systems, Hydrogen Energy Systems, Solar Buildings Energy Systems, Ocean Energy Systems, and Geothermal Energy Systems.

(b) AMENDED GOALS.—Whenever the Secretary determines that any one of the goals established under this section is no longer appropriate, the Secretary shall notify Congress, as part of a report submitted under section 10, of the reason for the determination and provide an amended goal that is consistent with the purpose stated in section 2.

(c) AUTHORIZATIONS.—There are authorized to be appropriated to the Secretary—

(1) for the Wind Energy Research Program, not to exceed $10,000,000 for fiscal year 1991; $11,500,000 for fiscal year 1992; and $11,500,000 for fiscal year 1993;

(2) for the Photovoltaic Energy Systems Program, not to exceed $39,000,000 for fiscal year 1991; $40,000,000 for fiscal year 1992; and $40,000,000 for fiscal year 1993;

(3) for the Solar Thermal Energy Systems Program, not to exceed $16,000,000 for fiscal year 1991; $17,000,000 for fiscal year 1992; and $17,000,000 for fiscal year 1993;

(4) for the Biofuels Energy Systems Program, not to exceed $16,000,000 for fiscal year 1991; $16,000,000 for fiscal year 1992; and $16,000,000 for fiscal year 1993;

(5) for the Hydrogen Energy Systems Program, not to exceed $4,000,000 for fiscal year 1991; $5,000,000 for fiscal year 1992; and $6,000,000 for fiscal year 1993;

(6) for the Solar Buildings Energy Systems Program, not to exceed $5,000,000 for fiscal year 1991; $5,000,000 for fiscal year 1992; and $5,000,000 for fiscal year 1993;

(7) for the Ocean Energy Systems Program, not to exceed $4,000,000 for fiscal year 1991; $5,000,000 for fiscal year 1992; and $5,000,000 for fiscal year 1993; and

(8) for the Geothermal Energy Systems Program, not to exceed $19,000,000 for fiscal year 1991; $20,500,000 for fiscal year 1992; and $23,000,000 for fiscal year 1993.

(d) REPORT ON OPTIONS.—As part of the first report submitted under section 10, the Secretary shall submit to Congress a report analyzing options available to the Secretary under existing law to assist the private sector with the timely commercialization of wind, photovoltaic, solar thermal, biofuels, hydrogen, solar buildings, ocean, and geothermal renewable energy technologies through emphasis on development and demonstration assistance to specific technologies in the research, development, and demonstration programs of the Department of Energy that are near commercial application.

SEC. 5. ENERGY EFFICIENCY RESEARCH AND DEVELOPMENT.

(a) NEW INITIATIVES.—The Secretary shall recommend amounts to be set aside for FY 1991 and FY 1992 for new initiatives in energy efficiency research, development,

and demonstration. Funds made available for new initiatives shall supplement and not supplant funds available to complete on-going energy efficiency research, development, and demonstration projects supported in whole or in part by the Secretary during fiscal year 1990. Funds made available for new initiatives shall be used by the Secretary to support the most promising and deserving new ideas in energy efficiency research, development, and demonstration brought to the attention of the Secretary during the previous fiscal year.

(b) AUTHORIZATIONS.—There are authorized to be appropriated to the Secretary—

(1) for transportation energy research, development, and demonstration, not to exceed $68,313,440 for fiscal year 1991; $71,045,977 for fiscal year 1992; and $73,887,816 for fiscal year 1993;

(2) for industrial energy efficiency research, development, and demonstration, not to exceed $53,492,000 for fiscal year 1991; $54,792,400 for fiscal year 1992; and $56,983,368 for fiscal year 1993;

(3) for building and community systems energy efficiency research, development, and demonstration, not to exceed $37,775,000 for fiscal year 1991; $45,000,000 for fiscal year 1992; and $53,000,000 for fiscal year 1993;

(4) for multi-sector energy efficiency research, development, and demonstration, not to exceed $37,871,000 for fiscal year 1991; $36,000,000 for fiscal year 1992; and $37,000,000 for fiscal year 1993; and

(5) for energy efficiency research, development, and demonstration policy and management, not to exceed $3,650,000 for fiscal year 1991; $3,950,000 for fiscal year 1992; and $4,200,000 for fiscal year 1993.

(c) REPROGRAMMING.—The Secretary may—

(1) increase by 10 percent or less; and

(2) 30 days after submitting notice to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate of the intention to do so, increase by 25 percent or less,

any specific authorization amount under subsection (b) or under section 4(c), to meet unexpected cost variations. Neither the total amount authorized under subsection (b) nor the total amount authorized under section 4(c) may be increased by any actions taken under this subsection. No action may be taken under this subsection that will result in the reduction of any specific authorization amount under subsection (b) or under section 4(c), except as provided in paragraph (1) or (2).

SEC. 6. SP-100 AUTHORIZATION.

Not less than $51,000,000 is authorized for the SP-100 program for each of the fiscal years 1990 and 1991.

SEC. 7. JOINT RESEARCH AND DEVELOPMENT VENTURES.

(a) FINDINGS AND PURPOSE.—

(1) FINDINGS.—For purposes of this section, Congress finds that joint research and development ventures can—

(A) improve coordination in technology development among firms in industries attempting to commercialize renewable energy and energy efficiency technologies;

(B) assist in setting national standards to improve the operation of markets for these technologies; and

(C) enhance the ability of domestic firms to compete with foreign enterprises in sales of renewable energy and energy efficiency technologies.

(2) PURPOSE.—The purpose of this section is to direct the Secretary to make use of joint research and development ventures to assist the private sector with further commercialization of renewable energy and energy efficiency technologies.

(b) JOINT RESEARCH AND DEVELOPMENT VENTURES.—

(1) ESTABLISHMENT.—The Secretary shall solicit industry proposals for joint research and development ventures in each of the technology areas under subsection (c). The Secretary shall select at least one joint research and development venture in each of those technology areas, unless no qualified proposals in that area are received. Each joint research and development venture selected under this section shall include at least one private sector firm. Research and development activities supported under this section shall be performed in the United States.

(2) COST SHARING.—The Secretary shall require that at least 30 percent of all costs of any joint research and development venture supported under this section be provided from non-Federal sources.

(3) ADVISORY COMMITTEE.—(A) The Secretary shall establish an Advisory Committee on Renewable Energy and Energy Efficiency Joint Research and Development Ventures (hereafter in this section referred to as the "Advisory Committee") to advise the Secretary on the development of the solicitation and evaluation criteria for joint research and development ventures, and on the evaluation of proposals received and the selection of projects. The Secretary shall appoint members to the Advisory Committee, including at least one member representing—

(i) the Secretary of Commerce;
(ii) the National Laboratories of the Department of Energy;
(iii) the Solar Energy Research Institute;
(iv) the Electric Power Research Institute;
(v) the Gas Research Institute;
(vi) the National Institute of Building Sciences;
(vii) the National Institute of Standards and Technology;
(viii) associations of firms in the major renewable energy manufacturing industries; and
(ix) associations of firms in the major energy efficiency manufacturing industries.

The Advisory Committee may establish such subcommittees as it considers necessary to carry out this Act.

(B) The Advisory Committee, within 120 days after its establishment, shall provide the Secretary with recommendations regarding the structure and selection criteria for a solicitation of proposals for joint research and development ventures. The Advisory Committee shall also advise the Secretary from time to time on the implementation of the joint research and development venture program. Recommendations of the Advisory Committee shall be available to the public.

(4) PUBLIC COMMENT.—After a draft solicitation for joint research and development ventures has been issued, the Secretary shall provide for a period of public comment before the issuance of a final solicitation.

(5) REPORTS TO CONGRESS.—Not later than 180 days after the date of the enactment of this Act, the Secretary shall report to Congress on actions taken under this section and plans for future actions to be taken under this section.

(6) PROTECTION OF PROPRIETARY RIGHTS.—Joint research and development ventures, participants in joint research and development ventures, and inventions developed as a result of joint research and development ventures under this section shall be subject to section 5 of the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 (102 Stat. 4075).

(c) TECHNOLOGIES.—

(1) PHOTOVOLTAICS TECHNOLOGY.—(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint research and development venture for the demonstration of photovoltaic conversion of solar energy in accordance with the provisions of this paragraph.

(B) The purpose of joint research and development ventures supported under this paragraph shall be to design, test, and demonstrate critical enabling technologies for photovoltaic conversion of solar energy so as to achieve, to the maximum extent practicable, the goals of the Photovoltaic Energy Systems Program set forth in section 4(a)(2), as those goals may be amended under section 4(b).

(C) There are authorized to be appropriated to the Secretary not to exceed $3,700,000 for each of the fiscal years 1991, 1992, and 1993 to carry out this paragraph.

(2) WIND ENERGY TECHNOLOGY.—(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint research and development venture for the demonstration of the conversion of wind energy in accordance with the provisions of this paragraph.

(B) The purpose of joint research and development ventures supported under this paragraph shall be to design, test, and demonstrate critical enabling technologies for the conversion of wind energy so as to achieve, to the maximum extent practicable, the goals of the Wind Energy Research Program set forth in section 4(a)(1), as those goals may be amended under section 4(b).

(C) There are authorized to be appropriated to the Secretary not to exceed $3,700,000 for each of the fiscal years 1991, 1992, and 1993 to carry out this paragraph.

(3) SOLAR THERMAL TECHNOLOGY.—(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint research and development

venture for the demonstration of the use of solar thermal energy in accordance with the provisions of this paragraph.

(B) The purpose of joint research and development ventures supported under this paragraph shall be to design, test, and demonstrate critical enabling technologies for the use of solar thermal energy so as to achieve, to the maximum extent practicable, the goals of the Solar Thermal Energy Systems Program set forth in section 4(a)(3), as those goals may be amended under section 4(b).

(C) There are authorized to be appropriated to the Secretary not to exceed $3,400,000 for each of the fiscal years 1991, 1992, and 1993 to carry out this paragraph.

(4) FACTORY-MADE HOUSING.—(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint research and development venture in order to establish regional projects to develop or demonstrate techniques to improve the energy performance of factory-made housing offered by United States firms. In locating projects under this paragraph, the Secretary shall consider regional differences in housing needs, housing design, construction technique, marketing practices, and construction materials.

(B) Projects supported pursuant to this paragraph shall be designed to demonstrate state-of-the-art product quality, energy efficiency, and adaptability to renewable forms of energy of factory-made housing offered for sale in the United States. Such projects shall—

(i) be structured to demonstrate improvements in housing design, fabrication, delivery systems, construction processes, and marketing;

(ii) develop a detailed characterization of the needs of the home building industry;

(iii) establish a close working relationship with all sectors of the home building industry; and

(iv) be coordinated to pool and conserve resources.

(C) There are authorized to be appropriated to the Secretary not to exceed $5,000,000 for each of the fiscal years 1991, 1992, and 1993 to carry out this paragraph.

(5) ADVANCED DISTRICT COOLING TECHNOLOGY.—(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint research and development venture for the demonstration of advanced district cooling technologies that are applicable in cities with high cooling loads, in accordance with the provisions of this paragraph.

(B) The purpose of joint research and development ventures supported under this paragraph shall be to develop technical strategies for decreasing the capital cost and increasing the energy efficiency of major district heating and cooling system components and to assist in making district cooling available to local governments.

(C) The Secretary shall select a city or cities for application of advanced district cooling technologies developed by joint research and development ventures supported under this paragraph. The activities to be carried out in such application shall include district cooling assessment, feasibility, and engineering design studies.

(D) There are authorized to be appropriated to the Secretary not to exceed $1,000,000 for each of the fiscal years 1991, 1992, and 1993 to carry out this paragraph.

(d) SECRETARIAL DISCRETION.—(1) If the Secretary, based on the recommendations of the Advisory Committee, with respect to a technology described in paragraph (1), (2), (3), (4), or (5) of subsection (c), determines that there is insufficient private sector interest in a joint research and development venture for the demonstration of such technology—

(A) that satisfies the requirement of subsection (b)(2);

(B) that will further the purpose of this Act; and

(C) that will advance the timely commercialization of the technology to be demonstrated,

the Secretary shall notify Congress and provide a written explanation of the reasons for the determination.

(2) Promptly after notifying the Congress under paragraph (1), the Secretary shall consult with the Advisory Committee, and, based on the recommendations of such Committee, shall promptly transmit to Congress a plan for the selection of a substitute field or technology in which to solicit joint research and development ventures that develop or demonstrate, consistent with this section, an alternative renewable energy or energy efficiency technology so as to accomplish the purpose of this Act. Any unexpended funds authorized to be appropriated under subsection (c) for joint

research and development ventures with respect to which a determination is made under paragraph (1) may be used for a substitute joint research and development venture selected under this paragraph.

(3) When 30 calendar days have elapsed after transmittal of a plan under paragraph (2), the Secretary shall proceed with solicitations for joint research and development ventures appropriate to that plan as if such joint research and development ventures were required under subsection (c).

(e) ADDITIONAL JOINT RESEARCH AND DEVELOPMENT VENTURES.—(1) The Secretary shall recommend to the Congress three additional joint research and development ventures in the fields of renewable energy or energy efficiency technologies for fiscal year 1992. Each proposed project shall be described in sufficient detail to support congressional authorization.

(2) In selecting proposed projects under this subsection, the Secretary shall consider the recommendations of the Advisory Committee, and shall take into account the extent to which such projects will contribute to earlier commercialization of key technologies than might not occur without Federal support under this subsection, and the extent to which such projects will contribute to the competitiveness of United States firms engaged in international trade in renewable energy technologies.

(3) Joint research and development ventures supported pursuant to a recommendation under this subsection shall be carried out as if they were required under subsection (c).

SEC. 8. RENEWABLE ENERGY EXPORTS.

(a) FINDINGS AND PURPOSE.—(1) For purposes of this section, Congress finds that—

(A) among the major problems in promoting exports of renewable energy technology are the lack of available information on overseas markets and the absence of financing for the purchase of the technologies; and

(B) the Committee on Renewable Energy, Commerce, and Trade ("CORECT") established under the Renewable Energy Industry Development Act (Public Law 98-370) currently coordinates Federal Government activities to promote renewable energy exports.

(2) The purpose of this section is to evaluate current efforts to promote exports of renewable energy technology, to establish a joint government-industry plan to identify promising technologies and increase the financing available for exports of renewable energy technologies, to target potential markets for these technologies, and to authorize funding of these activities.

(b) ANNUAL REPORT.—The Committee on Renewable Energy, Commerce, and Trade shall annually report to Congress. Each report submitted under this subsection shall describe the actions of each agency represented by a member of the Committee on Renewable Energy, Commerce, and Trade taken during the previous fiscal year to achieve the purposes of such Committee and of this section. Such report shall describe the exports of renewable energy technology that have occurred as a result of such agency actions.

(c) PLAN.—(1) The Committee on Renewable Energy, Commerce, and Trade shall—

(A) establish, in consultation with representatives of affected industries, a plan to maintain or increase the market share of the United States in international trade in renewable energy technologies, including technologies for production of alcohol fuels, biomass energy, geothermal energy, and wood energy, and in technologies for passive solar energy conversion, photovoltaics, solar thermal energy conversion, and wind energy conversion, and include in such plan guidelines for agencies that are members of the Committee with respect to the financing of exports of such renewable energy technologies;

(B) develop, in consultation with representatives of affected industries, administrative guidelines for Federal export loan programs to simplify application by firms seeking export assistance for renewable energy technologies from agencies implementing such programs; and

(C) target renewable energy technology markets for primary emphasis by Federal export loan programs, development programs, and private sector assistance programs.

(2) The Committee on Renewable Energy, Commerce, and Trade shall include a description of the plan established under paragraph (1)(A) in no later than the second report submitted under subsection (b), and shall include in subsequent reports a description of any modifications to such plan and of the progress in implementing the plan.

(d) AUTHORIZATIONS.—There are authorized to be appropriated to the Secretary for activities of the Committee on Renewable Energy, Commerce, and Trade not to exceed—

(1) $1,200,000 for fiscal year 1991;
(2) $1,500,000 for fiscal year 1992; and
(3) $1,800,000 for fiscal year 1993.

SEC. 9. DISSEMINATION OF INFORMATION.

Section 523 of the National Energy Conservation Policy Act (42 U.S.C. 8243) is amended by adding at the end the following new subsection:

"(d) In order to more widely disseminate information about the program under this part and under part 3 and the benefits of solar heating and cooling technology, the Secretary shall establish a program, which includes site visits and technical briefings, to disseminate such information to Federal procurement officers and Federal loan officers.".

SEC. 10. REPORTS.

(a) REPORT BY THE SECRETARY.—One year after the date of the enactment of this Act and annually thereafter, the Secretary shall report to Congress on the programs, projects, and joint research and development ventures supported under this Act and the progress being made toward accomplishing the goals and purposes set forth in this Act.

(b) NATIONAL ENERGY POLICY PLAN REPORT.—Each biennial submission of the National Energy Policy Plan under section 801 of the Department of Energy Organization Act (42 U.S.C. 7321) shall include a two-year strategic plan for energy technology research, development, and demonstration. Such plan shall address the role of federally-assisted research, development, and demonstration in the achievement of the national policy goals of the National Energy Policy Plan and shall assess both the level of support for energy research, development, and demonstration reasonably necessary to achieve these goals and the basis for allocating the support recommended by the President among the available alternatives.

SEC. 11. BUY-AMERICAN REQUIREMENT.

(a) DETERMINATION BY THE SECRETARY.—If the Secretary, with the concurrence of the United States Trade Representative and the Secretary of Commerce, determines that the public interest so requires, the Secretary is authorized to award to a domestic firm a contract that, under the use of competitive procedures, would be awarded to a foreign firm, if—

(1) the final product of the domestic firm will be completely assembled in the United States;
(2) when completely assembled, not less than 50 percent of the final product of the domestic firm will be domestically produced; and
(3) the difference between the bids submitted by the foreign and domestic firms is not more than 6 percent.

In determining under this subsection whether the public interest so requires, the Secretary shall take into account United States international obligations and trade relations.

(b) LIMITED APPLICATION.—This section shall not apply to the extent to which—

(1) such applicability would not be in the public interest;
(2) compelling national security considerations require otherwise; or
(3) the United States Trade Representative determines that such an award would be in violation of the General Agreement on Tariffs and Trade or an international agreement to which the United States is a party.

(c) LIMITATION.—This section shall apply only to contracts for which—

(1) amounts are authorized by this Act (including the amendments made by this Act) to be made available; and
(2) solicitations for bids are issued after the date of the enactment of this Act.

(d) REPORT TO CONGRESS.—The Secretary shall report to the Congress on contracts covered under this section and entered into with foreign entitities in fiscal years 1990 and 1991 and shall report to the Congress on the number of contracts that meet the requirements of subsection (a) but which are determined by the United States Trade Representative to be in violation of the General Agreement on Tariffs and Trade or an international agreement to which the United States is a party. The Secretary shall also report to the Congress on the number of contracts covered under this Act (including the amendments made by this Act) and awarded based upon the parameters of this section.

(e) DEFINITIONS.—For purposes of this section—

(1) DOMESTIC FIRM.—The term "domestic firm" means a business entity that is incorporated in the United States and that conducts business operations in the United States.

(2) FOREIGN FIRM.—The term "foreign firm" means a business entity not described in paragraph (1).

I. PURPOSES OF THE BILL

The purposes of H.R. 1216 are to provide a predictable funding base and to establish technical performance goals for the Federal renewable energy and energy efficiency research, development and demonstration programs by authorizing stable funding levels for three years. In addition, H.R. 1216 provides incentives for technology transfer of new renewable and energy efficiency developments by providing generic authority for the Secretary of Energy to enter into joint research and development ventures with the private sector. It is intended that the joint research and development ventures shall assist the private sector in commercializing the technologies. The bill contains authorization for five joint research and development ventures for the demonstration of selected technologies. These joint ventures are intended to accelerate the pace at which the technologies are moved out of the laboratories and into the private sector thereby stimulating the industrial base of the renewables and conservation industries.

II. BACKGROUND AND NEED FOR THE LEGISLATION

BACKGROUND

Widespread interest in renewable energy sources and improved energy efficiency in the United States began in the mid-1970's following the Arab Oil Embargo of 1973. Under the Energy Research and Development Administration and subsequently the Department of Energy, numerous research and development projects were initiated for adopting solar, biomass, hydropower, wind and other renewable resources to help meet our energy needs. Similarly, research and development efforts were also started in a variety of areas to use energy more efficiently in homes, factories and transportation. Projects varied from very mundane but important developments such as improved insulation to sophisticated energy saving technologies for producing and processing metals, such as steel and aluminum.

Support for such programs came from many interests. For example, those concerned with energy security, the trade balance, the environment, and domestic employment tended to view the renewable energy and energy efficiency technologies as making important contributions toward reducing the magnitude of our energy problems. While not reaching the expectations espoused by some in the mid-1970's, nevertheless, many energy policy experts believe the long-term potential of alternative technologies to alleviate our energy problems are significant.

For example, the transportation sector used 21.2 quads of energy in 1987, the vast majority of which was in the form of oil. Transportation petroleum consumption was approximately 10 million barrels per day, which account for 63 percent of all petroleum consumed and 27 percent of all energy used in the United States.

The goals of the transportation conservation programs are to improve the efficiency with which this sector of the economy uses petroleum and to enhance the flexibility of fuel use options and transportation related technologies. Continued funding for these programs will continue the research and development to develop scientific knowledge and proofs-of-concept for advanced engine technologies that demonstrate at least 30 percent improvement in fuel economy over conventional current production heat engines under similar weight to horsepower conditions that have the capability to meet emissions, safety, and noise reduction standards, and which have the potential for competitive initial and life-cycle costs when in production. Continued research and development of these programs will help overcome key technological barriers, particularly relating to energy storage, to private sector development of electric and hybrid vehicles. Further, these programs will benefit from an established fundamental ceramic and advanced materials technology base to support the U.S. heat engine industry, as well as utilize alternative fuels by providing industry with fundamental scientific information on the properties and behavioral characteristics of alternative transportation fuels when used in contemporary and advanced engines.

Renewable energy and improvements in energy efficiency represent secure sources from which to meet our energy needs. They reduce our reliance on imported oil thereby lessening the threat of supply disruptions. Correspondingly they reduce the associate balance of trade problems accompanying energy imports. Thus renewables and energy efficiency not only reduce our bill for imported fuels, they also provide jobs for American workers to build, install, and maintain renewable energy or energy efficiency devices.

In addition to these advantages, renewable energy and conservation are generally environmentally benign, in most cases producing few pollutants and reducing the demand for other fuels that contribute to air, soil or water pollution problems. Conservation measures can also often reduce costs for business or industry leading to lower product cost that allow businesses to compete more effectively in global markets.

Aside from these obvious advantages some renewable energy forms provide special advantages for remote locations. For example, solar cells and batteries can be used for radio or telephone relays on remote mountain tops or as navigational aids for ships or aircraft. In both instances the ability to operate independent of central supply systems provides great advantages.

More recent interest in renewable energy and energy efficiency has been directly linked to growing concerns about global warming. Growing evidence that the by-products associated with burning of fossil fuels, such as carbon dioxide, methane and other gases, are adversely effecting our climate has highlighted further interest in renewable energy and energy efficiency development. While the cause and effect relationship associated with carbon dioxide build-up and global warming are not fully understood, they are of sufficient concern that prudence dictates that energy options that do not present such problems should be given serious consideration. Renewable energy and energy efficiency provide options that mini-

mize such problems thereby making available technologies that are a hedge against the global warming problem.

The renewable energy business has gone through a retrenchment which left many smaller companies out of business and others struggling for survival. Several other countries have provided financial support for their developing industries; the industries are now beginning to realize the potential in the global energy marketplace. Countries such as Denmark are not just focusing on uses of renewable energy in their own countries, but are making inroads into the world export market. One factor in the successful marketing efforts is their aggressive and targeted development of exports, many developed with government subsidies.

NEED FOR THE LEGISLATION

The principle problems facing renewable energy and energy efficiency research, development and demonstration can be classified as falling into three broad areas. They are first, widely fluctuating prices of fossil fuels, the primary competition; second, lack of an established industrial and market infrastructure, and third, unstable and unpredictable federal support for research, development and demonstration varying from abundance to neglect. These three factors have thwarted growth of the technologies, the industrial base and prospective markets.

The large and rapid fluctuation in oil and other energy prices during the past 15 years have created a climate detrimental to the establishment of alternative energy sources of nearly all varieties. Renewable energy and energy efficiency technologies have faired no better than most and the infant state of the industry has arguably left these technologies even more vulnerable.

Because of their inherent potential to address nonmarket aspects of our energy problems, e.g., supply, security and environment, it is important that development of renewable energy and energy efficient technologies be viewed in a longer-term context outside of the short run vagaries of volatile oil prices.

In addition, government research, development and demonstration support can help to stimulate the industrial and market infrastructure so necessary for a vital, healthy United States industry. This industry can not only meet our domestic needs for energy alternatives, but it can also provide technologies and products for a burgeoning third world energy demand. These technologies will provide important alternatives to the third world that permit economic growth without exacerbating the global warming problem.

III. Legislative History

H.R. 1216 was introduced on March 1, 1989 by Reps. Lloyd, Sharp, Morrison (WA) and Moorhead. The bill currently has 110 cosponsors. It was jointly referred to the Committee on Energy and Commerce, and the Committee on Science, Space, and Technology. The Subcommittee on Energy Research and Development held a hearing on the bill on May 23, 1989, and the Subcommittee on Transportation, Aviation and Materials held a hearing on March 3, 1989, to review the Department of Energy's program, progress and budget requests for the next several fiscal years. The Subcommittee

on Energy Research and Development marked up the bill on September 21, 1989. The Subcommittee on Transportation, Aviation, and Materials marked up its part of the bill on October 4, 1989. The Committee on Science, Space, and Technology favorably ordered reported, a quorum being present, H.R. 1216, with an amendment, on October 19, 1989. The Subcommittee on Energy and Power, of the Committee on Energy and Commerce, held a hearing on H.R. 1216 on April 26, 1989, and a markup on June 15, 1989.

H.R. 1216 is based on H.R. 4226, the Renewable Energy and Energy Conservation Commercialization and Development Act of 1988. In the 100th Congress, the legislation was the focus of two House Congressional hearings, before the Subcommittee on Energy and Power on April 27, 1988, and the Subcommittee on Energy Research and Development on June 30, 1988. H.R. 4226 was marked up by the Energy Research and Development Subcommittee on September 22, 1988.

A companion bill to H.R. 1216, S. 488, was introduced by Senator Wyche Fowler of Georgia on March 1, 1989, and was reported out of the Senate Energy and Natural Resources Committee on August 4, 1989. The bill passed the Senate on September 22, 1989.

IV. Explanation of Committee Amendment

The Committee on Science, Space, and Technology adopted an amendment in the nature of a substitute to H.R. 1216 and the changes are described below. Additional details about the bill are provided in the Section-by-Section analysis.

Section 3—Definitions.—The term "non-federal person" has been defined for purposes of the Act as an entity located in the United States, the controlling interest (as defined by the Secretary) of which is held by citizens of the United States, which agrees to manufacture or reproduce substantially within the United States for commercial sale any invention that may result from an agreement under this Act.

The term "United States" means the several States, the District of Columbia, the Commonwealth of Puerto Rico, the United States Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any other Commonwealth, territory, or possession of the United States.

By specifying the definitions of "non-federal person" and "United States", the Committee intends that the joint research and development ventures will not be carried out in foreign nations. This restriction is not intended to prohibit foreign participation in research and development projects at the Department. One of the purposes of the Act is to ensure that domestic industry be able to commercialize technologies so as to be able to compete in foreign markets.

Section 4—National Goals and Multi-year Funding Authorizations for Renewable Energy Programs.—The Committee eliminated the market penetration goals for wind and photovoltaics understanding the difficulty in legislating market forces. The Committee believes that mandating the market goals will place an undue burden on technology development.

Multi-year authorizations are provided for Wind, Photovoltaics, Solar Thermal, Biofuels, Hydrogen, Solar Buildings, Ocean and Geothermal Energy Systems. The Committee added a line item authorization for the Hydrogen research and development program. The program has been in existence for three years without a formal authorization and has been carried as a subprogram within Biofuels. The Committee has been supportive of the Hydrogen work and believes it deserves the emphasis of a separate line item. The Committee adopted the following Committee View on Hyrogen Research and Development.

COMMITTEE VIEW

The Committee believes that hydrogen can and should be a key energy source for the future. Its abundance in water, and non-polluting quality of returning to water when burned, make widespread use an important national policy goal. With concern growing everyday over ozone depletion and the greenhouse effect, hydrogen is a logical potential long-term alternative to fossil fuels. It could be used for everything from the generation of electricity to fuel for aircraft and space travel.

But hydrogen energy research must have its own aggressive, focused and coordinated program within the Department of Energy. Current commercial production techniques are expensive and still rely on fossil fuels as the feedstock since there are no natural sources of pure hydrogen. While biofuels are a good hydrogen source, so could solar, photochemical, photoelectrochemical, and ocean energy plants. Expanded developmental efforts on hydrogen storage and transport technologies are also needed. But R&D is this area and commercialization initiatives are already well underway in other countries by our international competitors.

In this regard, the Committee has established a separate research, development and demonstration program for hydrogen which almost triples the current funding commitment. It is hoped that the fiscal year 1991 Department of Energy budget reflects this explicit program authorization. This will be necessary for the Energy Secretary to establish the specific 1995 hydrogen energy system cost and performance goals required one year after enactment. This report should also describe the new program's research objectives, relationships with the private sector to develop hydrogen as a fuel, and a strategy for commercialization.

Section 5—Multiyear Authorizations for Industrial Energy Efficiency, Building and Community Systems, Multisector, Transportation, and Policy and Management Programs Were Increased.—Since the introduction of H.R. 1216, the energy efficiency programs received a substantial increase above request levels. The Committee increases reflect concurrence as to the importance of the programs.

H.R. 1216—RENEWABLE ENERGY

[Dollars in millions]

	Fiscal years—			
	1990 appropriation	1991	1992	1993
Wind	$9.3	$10.0	$11.5	$11.5
Photovoltaics	35.5	39.0	40.0	40.0
Solar Thermal	15.3	16.0	17.0	17.0
Biofuels	14.1	16.0	16.0	16.0
Hydrogen	2.4	4.0	5.0	6.0
Solar Buildings	4.2	5.0	5.0	5.0
Ocean	4.1	4.0	5.0	5.0
Geothermal	18.5	19.0	20.5	23.0
Total	103.4	113.0	120.0	123.5

ENERGY EFFICIENCY TECHNOLOGIES

[Dollars in millions]

	1990 appropriation	1991	1992	1993
Buildings and community systems	$36.3	$37.8	$45.0	$53.0
Industrial	51.4	53.5	54.7	56.9
Multisector	36.4	37.9	36.0	37.0
Policy and management	3.5	3.6	3.9	4.2
Transportation	65.7	68.3	71.0	73.9
Total	193.3	201.1	210.6	225.0

In the Transportation Program, the Committee recommends authorization levels of $68,313,440, $71,045,977 and $73,887,816 for fiscal years 1991–1993. The amounts are based on four percent annual inflationary growth from a recommended level of $65,686,000 for fiscal year 1990 as shown in the following table:

DEPARTMENT OF ENERGY BUDGET REQUEST FOR TRANSPORTATION RESEARCH AND DEVELOPMENT PROGRAMS

[Dollars in millions]

Program	1989 actual	DOE 1990 request	Committee increase	Committee recommendation
Vehicle propulsion R&D	$16.435	$7.230	+$10.351	$17.581
Alternative fuels utilization	2.160	2.835	+5.115	7.950
Electric Hybrid Vehicle Program	13.918	4.870	+11.275	16.145
Technology assessment and transfer	2.291	1,=.000	+.600	1.600
Advanced materials development	15.000	10.330	+4.670	15.000
High temperature materials lab	2.000	2.000	+.600	2.600
Capital equipment	.500	0	+2.500	2.500
Program direction	2.280	1.489	+.821	2.310
Total	54.585	29.754	35.932	65.686

The Committee added reprogramming authority for the multi-year authorizations. The authority allows the Secretary to reprogram up to 10 percent of the authorizations as needed, without

seeking Congressional approval. The Secretary may reprogram up to 25 percent of the funds within each budget category with the approval of the Committee on Science, Space, and Technology of the U.S. House of Representatives and the Committee on Energy and Natural Resources of the U.S. Senate. The Congress will have 30 days to respond to the Secretarial reprogramming request before action may be taken. It is not intended that the Secretary may reprogram all the funds in one program to other programs if the action would result in termination of an existing program unless Congressional authorization is received.

Given the nature of research and development where scientific breakthroughs are not dictated by budget authorizations, the Committee believes that the addition of the reprogramming authority will allow Secretarial discretion to guard against funding shortfalls.

The Committee developed the three year authorization based on current program direction. If serious shortfalls occur within the scope of this Act, the Committee may consider reevaluating recommended funding levels as part of an annual authorization.

Section 6.—Authorization of the SP–100 Program.—The SP–100 Program is a joint activity among the Department of Energy, the National Aeronautics and Space Administration, and the Department of Defense. The bill authorizes the Department of Energy to provide at least $51,000,000 for FY 1990, and $51,000,000 for FY 1991 for the program.

Section 7.—Joint Research and Development Ventures.—The number of ventures was reduced from six to five, with the Export Technology Project eliminated. The Committee believes that thrust of this project should be considered as part of the increased mandate for the Committee on Renewable Energy, Commerce, and Trade (CORECT). CORECT is already charged with the responsibility of promoting U.S. energy exports in foreign markets. The budget authority carried in the original bill for the project has been redistributed among the five remaining projects.

As introduced, H.R. 1216 required the establishment of seven Advisory Committees to assist the Secretary with project solicitation, selection and implementation. The Committee believes that seven Committees would place an undue Administrative burden on the Department and is unnecessary. The substitute provides one advisory committee instead of the original seven.

Protection of Proprietary Rights. The Committee has been supportive of the need to bring technology from the laboratory to the marketplace. The Committee believes that ensuring the protection of proprietary and patent rights is an important consideration to the success of the proposed agreements. Language adopted by the Committee in previous legislation, Section 5 of the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1989 will provide the proper protection and disposition of rights and benefits.

V. Section-by-Section Analysis

SECTION 2

Section 2 of the bill sets forth the purposes of the Act.

SECTION 3

Section 3 contains the definitions of terms used in the Act.

SECTION 4

Subsection (a) of section 4 establishes performance goals for the Department of Energy programs in wind energy, photovoltaics and solar thermal research, development and demonstration and requires the Secretary of Energy to submit proposed goals for programs in renewable energy RD&D not specified as part of the FY 1991 budget request.

Subsection (b) provides for the amendment of goals when appropriate.

Subsection (c) provides authorization for FY 1991–1993 for renewable energy programs of the Department in Wind energy, Photovoltaics, Biofuels, Hydrogen, Solar Thermal and Geothermal energy. Total amounts are authorized as follows: $113 million for FY 1991, $121 million for FY 1992, and $124 million for FY 1993.

Subsection (d) requires the Secretary of Energy to submit to Congress one year after enactment of the Act, a report on options available to the Secretary of Energy under existing law to accelerate the timely commercialization of renewable energy technologies.

SECTION 5

Subsection (a) of section 5 requires the Secretary of Energy to set aside in his budget requests for FY 1991 and 1992 funds for new initiatives in Energy Efficiency Research Development and Demonstration.

Subsection (b) authorizes appropriations for FY 1991–1993 for energy efficiency RD&D programs in Industrial energy efficiency, Buildings and Community Systems, Multi-sector, Transportation, and Policy and Management. Total amounts authorized are as follows: $201.0 million for FY 1991, $210.6 million for FY 1992, and $224.9 million for FY 1993.

Subsection (c) provides 10% discretionary reprogramming authority within the renewables and energy efficiency subprograms. It also allows a 25% change in the subprogram allocations with Congressional approval of the authorizing Committees. Changes in subprogram allocations will not increase overall program levels.

SECTION 6

Authorizes appropriations for the SP–100 program for FY 1990 and FY 1991 for $51,000,000 for each year.

SECTION 7

Subsections (a) and (b) require the Secretary of Energy to establish and provide financial assistance to five joint research and development ventures to assist in the commercialization of renewable energy and energy efficiency technologies. These ventures are to address commercialization issues in Wind energy, Photovoltaics, Solar Thermal energy, Factory-made housing, and Advanced District Cooling.

At least 30 percent of the costs of any joint research and development venture must be provided from non-federal sources.

Establishes an Advisory Committee on Renewable Energy and Energy Efficiency Joint Research and Development Ventures to advise the Secretary on the development, solicitation, and selection of the projects.

Provision for protection of proprietary rights and patent policy under the Act shall be subject to the provisions of Section 5 of the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988.

Each project is described in subsection (c). This section also provides a total of $19.3 million in authorizations for the five projects for each of the fiscal years 1991–1993.

Subsection (d) provides Secretarial discretion, under certain circumstances to substitute alternative projects for any of the five specified in the bill.

Subsection (e) requires the Secretary to submit additional proposals to Congress for possible authorization of proof-of-concept or near-commercial demonstrations of Wind, Photovoltaics, and Solar Thermal technology, so that the Secretary will investigate and propose his own commercialization projects for possible funding.

SECTION 8

This section requires the Secretary of Energy to review the activities of the Committee on Renewable Energy, Commerce and Trade (COREGT) and requires the Committee to establish a joint government-industry plan to increase the market share of United States in the trade of renewable energy technologies and products. A total of $4.5 million is authorized for the activities of CORECT for fiscal years 1991–1993.

SECTION 9

This section amends the National Energy Conservation Policy Act to allow the Secretary to establish a program to disseminate information on the benefits of solar heating and cooling technology to all federal procurement officers and federal loan officers.

SECTION 10

This section requires an annual report by the Secretary of Energy to Congress on activities under the Act. It also requires a two-year strategic plan for energy technology RD&D as part of the National Energy Policy Plan submitted annually under Title VIII of Public Law 95–91.

SECTION 11

The buy-American section allows the Secretary to give preference to domestic firms in awarding contracts for work authorized under this Act.

VI. CBO Cost Estimate

U.S. Congress,
Congressional Budget Office,
Washington, DC, October 23, 1989.

Hon. Robert A. Roe,
Chairman, Committee on Science, Space, and Technology,
U.S. House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the attached cost estimate for H.R. 1216, the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

Robert F. Hale.
(For Robert D. Reischauer, Director).

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

1. Bill number: H.R. 1216.
2. Bill title: Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989.
3. Bill status: Ordered reported by the House Committee on Science, Space, and Technology on October 19, 1989.
4. Bill purpose: The bill would authorize appropriations for research, development, and demonstration of renewable energy and energy efficiency technologies for the stated purpose of helping to ensure a stable and secure future energy supply. In addition, H.R. 1216 would authorize funding for research and development of space power systems by the Department of Energy.
5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1990	1991	1992	1993	1994
Authorization level	51	383	349	367	.....
Less: 1990 appropriations	−32	.....	.....	.....	.....
Net additional authorizations	19	383	349	367	.....
Estimated outlays	10	133	324	338	249

The costs of this bill fall within budget function 270.

Basis of Estimate

The bill contains three-year authorization levels for fiscal years 1991, 1992, and 1993 for several existing research and development (R&D) programs in renewable energy and energy conservation, as well as for new joint venture programs in these energy R&D areas.

In addition, H.R. 1216 authorizes not less than $51 million for each of the fiscal years 1990 and 1991 for Department of Energy efforts in developing space power systems. Of the $51 million authorization in fiscal year 1990 for space power systems, $32 million has been appropriated in Public Law 101-101.

For the purpose of this estimate, CBO assumes that all amounts authorized will be appropriated and that spending will occur at historical rates for similar R&D programs.

6. Estimated cost to State and local governments: None.

7. Estimate comparison: None.

8. Previous CBO estimate: None.

9. Estimate prepared by: Pete Fontaine.

10. Estimate approved by: C. G. Nuckols for James L. Blum, Assistant Director for Budget Analysis.

VII. Oversight Findings and Recommendations by the Committee on Government Operations

No statement of findings and recommendations on oversight activity pursuant to rule X, clause 2(b)(2), and rule XI, clause 2(1)(3), of the Rules of the House of Representatives, have been submitted by the Committee on Government Operations for inclusion in this report.

VIII. Committee Recommendation

A quorum being present, the bill was ordered reported on October 19, 1989, by a voice vote of the Committee.

IX. Impact of Inflation

In accordance with rule XI, clause 2(1)(4) of the Rules of the House of Representatives, this legislation is assessed to have no adverse inflationary effect on prices and costs in the operation of the national economy.

X. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3 of Rule XIII of the Rules of the House of Representatives, change in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

Section 523 of the National Energy Conservation Policy Act

SEC. 523. DUTIES OF SECRETARY.

(a) * * *

* * * * * * *

(d) In order to more widely disseminate information about the program under this part and under part 3 and the benefits of solar heating and cooling technology, the Secretary shall establish a program, which includes site visits and technical briefings, to disseminate such information to Federal procurement officers and Federal loan officers.

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